

WHAT IS CLAIMED IS:

1 1. A spacecraft network, the network comprising:
2 a first server spacecraft disposed in a first server orbit;
3 a first client spacecraft disposed in a first client orbit;
4 a wireless local area network formed between at least the first server
5 spacecraft and the first client spacecraft, the wireless local area network comprising:
6 at least one communication channel to transmit and receive spatial
7 information between at least the first server spacecraft and the first client spacecraft, the
8 spatial information indicative of at least a first server position and a first server orientation of
9 the first server spacecraft and a first client position and a first client orientation of the first
10 client spacecraft;
11 at least one receiver to receive a first communication signal including
12 at least routing information, the routing information including at least a destination spacecraft
13 as a destination of the first communication signal;
14 at least one routing system to determine a desired route from a plurality
15 of routes to transmit the first communication signal to the destination spacecraft, each of the
16 plurality of routes corresponding to a plurality of path spacecrafts;
17 at least one transmitter to transmit the first communication signal based
18 upon the desired route and the spatial information of the plurality of path spacecrafts of the
19 desired route; \n
20 wherein
21 the first client spacecraft is free from the at least one routing system;
22 the first server spacecraft includes one of the at least one routing
23 system.

1 2. The spacecraft network of claim 1 wherein the wireless local network
2 is capable of transmitting and receiving the first communication signal directly between the
3 first server spacecraft and the first client spacecraft, the first server spacecraft and the first
4 client spacecraft having a communication distance equal to or larger than 64 kilometers.

1 3. The spacecraft network of claim 2 wherein the communication
2 distance is equal to 200 kilometers.

- 1 4. The spacecraft network of claim 1 wherein the first server spacecraft
2 receives the first communication signal from the first client spacecraft.
- 1 5. The spacecraft network of claim 1 wherein the destination spacecraft is
2 a second client spacecraft, the second client spacecraft being free from the at least one routing
3 system.
- 1 6. The spacecraft network of claim 5 wherein the second client spacecraft
2 is the same as the first client spacecraft.
- 1 7. The spacecraft network of claim 5 wherein the second client spacecraft
2 is different from the first client spacecraft.
- 1 8. The spacecraft network of claim 1 wherein the first communication
2 signal provides data to the destination spacecraft.
- 1 9. The spacecraft network of claim 1 wherein the first communication
2 signal provides an energy to the destination spacecraft, the destination spacecraft using the
3 energy as a power source.
- 1 10. The spacecraft network of claim 1 wherein the first server spacecraft
2 comprises:
3 a first spacecraft platform; and
4 a first server system operable to manage the first communication signal in the
5 wireless local area network to or from the first client spacecraft.
- 1 11. The spacecraft network of claim 1 wherein the first server spacecraft is
2 operable to manage the first communication signal between the first client spacecraft and a
3 ground terminal.
- 1 12. The spacecraft network of claim 11 wherein the first server spacecraft
2 is operable to manage the first communication signal by routing the first communication
3 signal between the first client spacecraft and the ground terminal.
- 1 13. The spacecraft network of claim 11 wherein the ground terminal is
2 communicatively connected to a ground-based network.

1 14. The spacecraft network of claim 13 wherein the ground-based network
2 is the Internet.

1 15. The spacecraft network of claim 1 wherein the first server spacecraft is
2 operable to route the first communication signal between the first client spacecraft and a
3 second client spacecraft, the second client spacecraft being free from the at least one routing
4 system.

1 16. The spacecraft network of claim 15 wherein the first client spacecraft
2 and the second spacecraft are of a same type.

1 17. The spacecraft network of claim 16 wherein the first client spacecraft
2 and the second client spacecraft are operable to perform missions of a same type.

1 18. The spacecraft network of claim 15 wherein the first client spacecraft
2 and the second spacecraft are of different types.

1 19. The spacecraft network of claim 18 wherein the first client spacecraft
2 and the second client spacecraft are operable to perform missions of different types.

1 20. The spacecraft network of claim 1 wherein the first client spacecraft is
2 a part of a remote cluster of client spacecrafts.

1 21. The spacecraft network of claim 20 wherein the first server spacecraft
2 is operable to manage the first communication signal by routing the first communication
3 signal to or from the first client spacecraft in the remote cluster of client spacecrafts.

1 22. The spacecraft network of claim 20 wherein the remote cluster of
2 client spacecrafts comprises the first client spacecraft and a second client spacecraft, the first
3 client spacecraft and the second client spacecraft being of a same type.

1 23. The spacecraft network of claim 22 wherein the first client spacecraft
2 and the second client spacecraft are operable to perform missions of a same type .

1 24. The spacecraft network of claim 20 wherein the remote cluster of
2 client spacecrafts comprises the first client spacecraft and a second client spacecraft, the first
3 client spacecraft and the second client spacecraft being of different types.

1 25. A spacecraft network, the network comprising:
2 a first server spacecraft disposed in a first server orbit;
3 a second server spacecraft disposed in a second server orbit;
4 a wireless wide area network formed between at least the first server
5 spacecraft and the second server spacecraft, the wireless wide area network comprising:
6 at least one communication channel to transmit and receive spatial
7 information between at least the first server spacecraft and the second server spacecraft, the
8 spatial information indicative of at least a first server position and a first server orientation of
9 the first server spacecraft and a second server position and a second server orientation of the
10 second server spacecraft;
11 at least one receiver to receive a first communication signal including
12 at least routing information at the first server spacecraft, the routing information including at
13 least a destination spacecraft as a destination of the first communication signal;
14 at least one routing system to determine a desired route from a plurality
15 of routes to transmit the first communication signal from the first server spacecraft to the
16 destination spacecraft, each of the plurality of routes corresponding to a plurality of path
17 spacecrafts;
18 at least one transmitter to transmit the first communication signal based
19 upon the desired route and the spatial information of the plurality of path spacecrafts of the
20 desired route;
21 wherein
22 the first server spacecraft includes one of the at least one routing
23 system.

1 26. The spacecraft network of claim 25 wherein the wireless wide network
2 is capable of transmitting and receiving the first communication signal directly between the
3 first server spacecraft and the second server spacecraft, the first server spacecraft and the
4 second server spacecraft having a communication distance equal to or larger than 100
5 kilometers.

1 27. The spacecraft network of claim 25 wherein the first server spacecraft
2 is a base station of the wireless wide area network and connected to a wireless local area
3 network including at least the first server spacecraft and a first client spacecraft.

1 28. The spacecraft network of claim 25 wherein the first server spacecraft
2 receives the first communication signal from the second server spacecraft.

1 29. The spacecraft network of claim 25 wherein the destination spacecraft
2 is the second server spacecraft.

1 30. The spacecraft network of claim 25 wherein the first communication
2 signal provides data to the destination spacecraft.

1 31. The spacecraft network of claim 25 wherein the first communication
2 signal provides an energy to the destination spacecraft; the destination spacecraft using the
3 energy as a power source.

1 32. The spacecraft network of claim 25 wherein the first server spacecraft
2 comprises:

3 a first spacecraft platform; and

4 a first server system operable to manage the first communication signal in the
5 wireless wide area network to or from the second server client spacecraft.

1 33. The spacecraft network of claim 25 wherein the first server spacecraft
2 is operable to manage the first communication signal between the second server spacecraft
3 and a ground terminal.

1 34. The spacecraft network of claim 33 wherein the first server spacecraft
2 is operable to manage the first communication signal by routing the first communication
3 signal between the second server spacecraft and the ground terminal.

1 35. The spacecraft network of claim 34 wherein the ground terminal is
2 communicatively connected to a ground-based network.

1 36. The spacecraft network of claim 35 wherein the ground-based network
2 is the Internet.

1 37. The spacecraft network of claim 25 wherein the first server spacecraft
2 is operable to route the first communications signal between an originating spacecraft and the
3 destination spacecraft, the destination spacecraft being the second server spacecraft.

1 38. The spacecraft network of claim 37 wherein the originating spacecraft
2 being a client spacecraft.

1 39. The spacecraft network of claim 37 wherein the originating spacecraft
2 being a third server spacecraft

1 40. The spacecraft network of claim 25 wherein the first server spacecraft
2 is operable to route the first communications signal between an originating spacecraft and the
3 destination spacecraft, the destination spacecraft being a client spacecraft.

1 41. The spacecraft network of claim 40 wherein the originating spacecraft
2 being a client spacecraft.

1 42. The spacecraft network of claim 40 wherein the originating spacecraft
2 being a third server spacecraft.

1 43. The spacecraft network of claim 25 wherein the first server spacecraft
2 is operable to manage the first communication signal by routing the first communication
3 signal to or from the second server spacecraft.

1 44. A method for spacecraft communication, the method comprising:
2 disposing a first server spacecraft in a first server orbit;
3 disposing a first client spacecraft in a first client orbit;
4 transmitting and receiving spatial information between the first server
5 spacecraft and the first client spacecraft, the spatial information indicative of at least a first
6 server position and a first server orientation of the first server spacecraft and a first client
7 position and a first client orientation of the first client spacecraft;
8 receiving an information packet including at least routing information, the
9 routing information including at least a destination spacecraft as a destination of the
10 information packet;
11 determining a desired route from a plurality of routes to transmit the
12 information packet data to the destination spacecraft based on at least the spatial information
13 of the destination spacecraft, the plurality of routes corresponding to a plurality of paths
14 respectively, each of the plurality of paths including a plurality of path spacecrafts;
15 transmitting the information packet based upon the desired route and the
16 spatial information of the plurality of path spacecrafts of the desired route;

17 wherein
18 the first client spacecraft is free from the at least one routing system;
19 the first server spacecraft includes one of the at least one routing
20 system.

1 45. A method for spacecraft communication, the method comprising:
2 disposing a first server spacecraft in a first server orbit;
3 disposing a second server spacecraft in a second server orbit;
4 transmitting and receiving spatial information between the first server
5 spacecraft and the second server spacecraft, the spatial information indicative of at least a
6 first server position and a first server orientation of the first server spacecraft and a second
7 server position and a second server orientation of the second server spacecraft;
8 receiving an information packet including at least routing information, the
9 routing information including at least a destination spacecraft as a destination of the
10 information packet;
11 determining a desired route from a plurality of routes to transmit the
12 information packet data to the destination spacecraft based on at least the spatial information
13 of the destination spacecraft, the plurality of routes corresponding to a plurality of paths
14 respectively, each of the plurality of paths including a plurality of path spacecrafts;
15 transmitting the information packet based upon the desired route and the
16 spatial information of the plurality of path spacecrafts of the desired route;
17 wherein
18 the first server spacecraft includes one of the at least one routing
19 system.